



Keeping Legacy Systems Viable....

AN/APS-130 RADAR SET

Spares Reverse Engineering & Limited Production

Airborne Electronic Warfare Systems

NAVSEA Crane, Code 802

APS-130 Overview



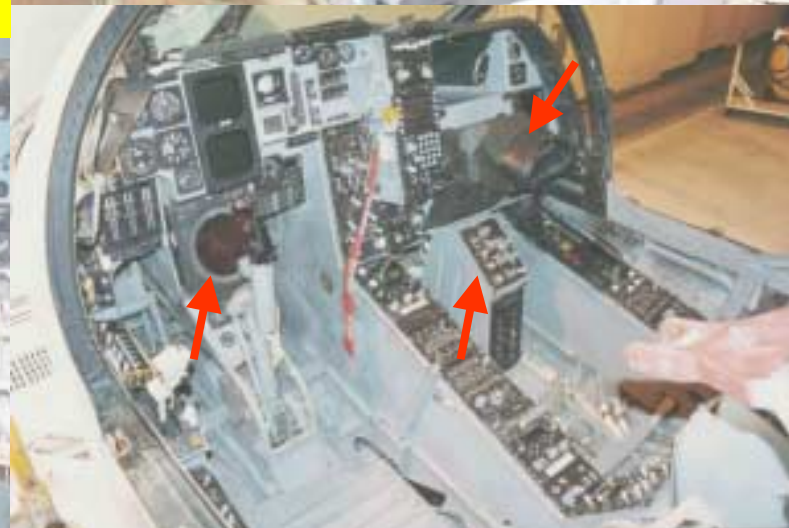
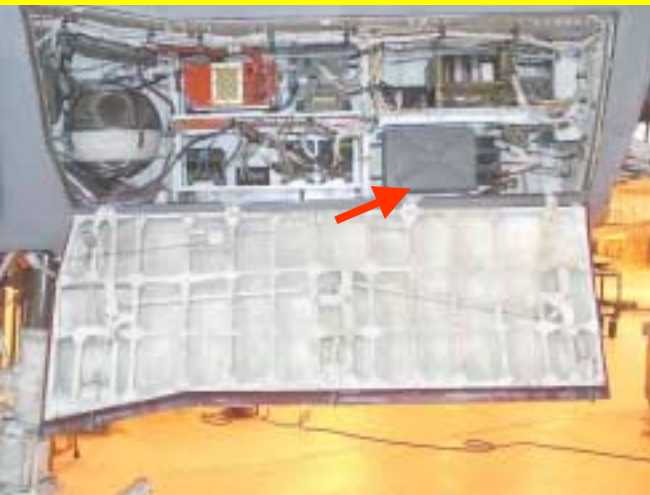
Navy EA-6B Prowler

The Only U.S./NATO Tactical Stand-Off Radar & Communications Jamming Platform



Function: Navigation & Weather Radar

A 30+ Year Old System Deployed in all EA-6Bs Since 1971





A Common Problem for Legacy Systems...



✓ Attrition of Spare Weapons Replaceable and Shop Replaceable Assemblies (WRA/SRA) Results in Increased NAVICP Backorders & Decreased System & Aircraft Readiness

✓ Vanishing Vendor/Supplier Base

- Old Technology
- Infrequent, Low-Quantity Procurements
 - High Cost/Long Lead

NAVICP Asset Readiness - NAVY MARINE CORPS DISTRICT

Aviation - 9/25/02 Lrc: DQC

NIIN: 011247954

Below Left: Alternate NIIN Part Number Brown Schedule Contact Inventory Manager

National Stock Number	5845-01-124-7954	COG	TR
Description	RECEIVER RADAR	MOC	II
Quarterly Demand	2.16	SMRB	Code
Wearout Rate	0.00	Survival Rate	1.00
Standard Price	\$83,010.00	Repair Price	\$9,180.00
Unit of Issue	EA		

Asset Picture	Family Group Code	Family Relationship	Head
On Hand	A Condition: 4	F Condition: 0	M Condition: 3
			G Condition: 0

Location of A Condition Assets

Stock Status	On Hand	Due-In	Due-Out	Planned Requirements
RPI	4	21	0	21
HCN-RPI	3	0	0	0
PURPOSE-ALL	28	9	0	27

Backorder: 0 Details Repair Turn Around Time (Quarters): 0.45
Issue Priority Group: 1 Procurement Lead Time (Quarters): 7.2

Item Manager Notes:
8701842 - ZED112L PROJECT WORK ORDER TO CRANE TO MANUFACTURE 11 EA WITH EDO OF JUNE 03. FOLLOW ONH REQUIREMENT FOR 5 EA ON NAVICP HOLD-TABLE.

Insufficient Remaining Service Life to Justify Return-On-Investment of Radar Upgrade/Replacement



NAVSEA Crane's Airborne Electronic Warfare Systems Department

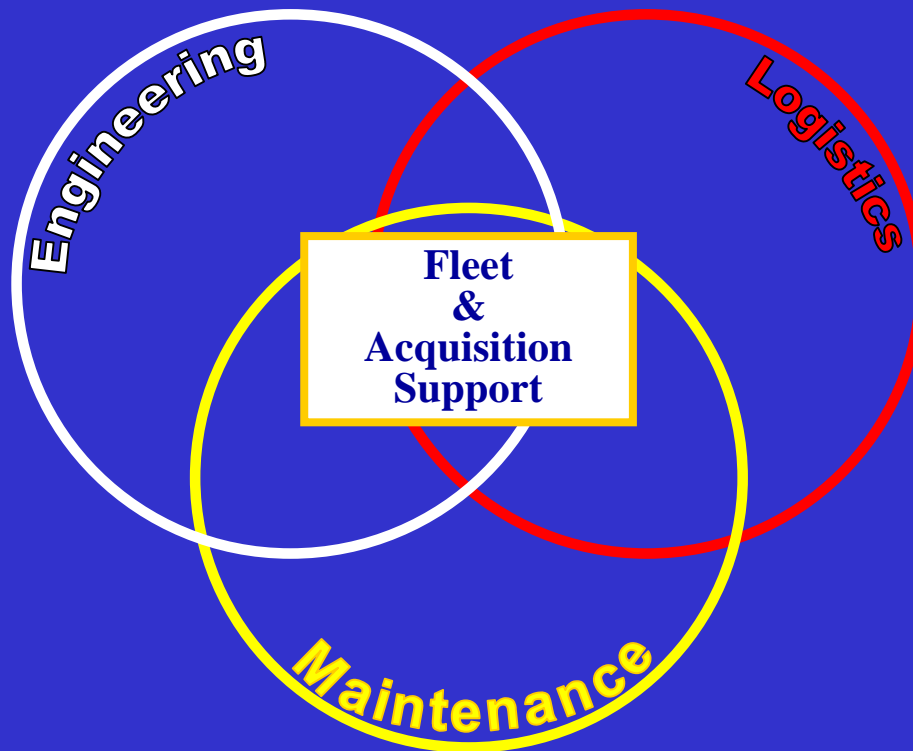


How Did We Get Involved?

APS-130 Depot
Repair & Overhaul

Fleet Support Team
(ISE&L)

Organic Capabilities
for Avionics & ATE
Design, Test &
Manufacture



Workforce

Technicians.....117
Engineers..... 70
Logisticians.....32
Administrative...31
Artisans.....25

Total..... 275

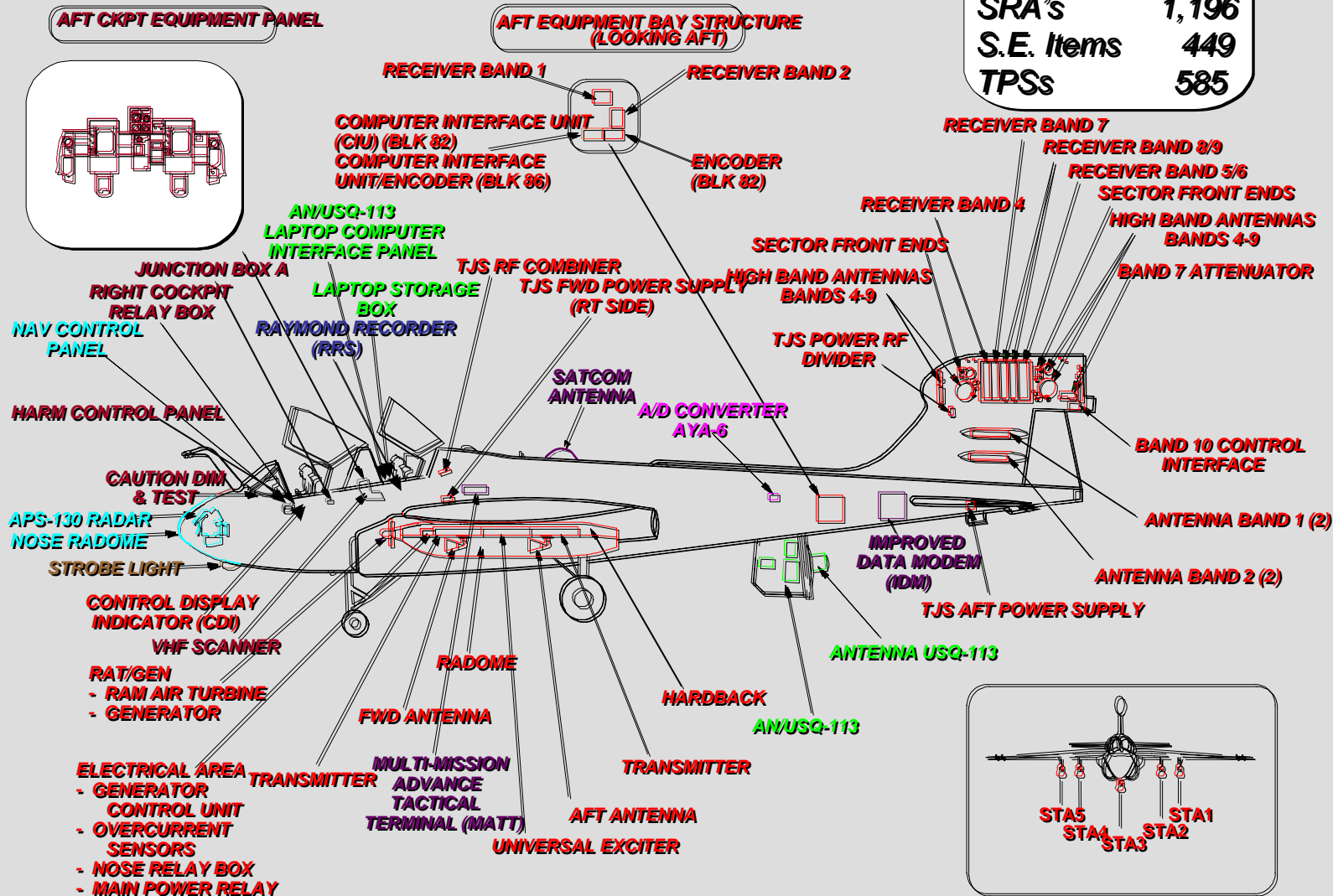
Fleet Support			Acquisition Support	
Maintenance, Repair & Upgrade	In-Service Engineering & Logistics	Product Design & Development	Engineering & Logistics Technical Support	Acquisition Program/Project Management

UYH-4 Signal Data Recorder

- Cockpit
- Airframe
- Other Avionics

PROWLER **SUPPORT**

WRA's	213
SRA's	1,196
S.E. Items	449
TPSs	585





APS-130

WRA & SRA Needs



**Customer Defined Spares
Requirements Based Upon
Fleet Demand & Backorders**

NOMENCLATURE	NIIN	PART NUMBER	QTY
+/- 75 POWER SUPPLY CCA	011397378	2120-84006-107	16
COMPARATOR BIT LOGIC	011397380	2120-85026-107	5
TRANSMITTER BIT CCA	011388152	2120-81006-107	3
SERVO BEARING ASSY	011444130	2120-82016-101	4
VIDEO AMP CCA	011214571	2120-84009-107	9
MAGNETRON ASSY MOD	011359238	2120-81130-107	5
VIDEO SWITCH CCA	011168694	2120-82011-107	5
TIME LOGIC CCA	011168693	2120-82010-107	8
CHARGE & REGULATOR	011247851	2120-81040-101	4
RADAR CONTROL PANEL	011845272	2120-85000-218	11
RADAR RECEIVER	011247954	2120-80001-101	16
SWEEP DEMODULATOR	011168695	2120-82013-107	5
REFERENCE SIGNAL GEN	011247929	2120-82000-107	7

APS-130

WRA & SRA Spares



Built In Test (3)



Transmitter Modulator



Azimuth Range
Elevation Indicator



Low Voltage Power
Supply



Radar Control Unit (11)



Comparator
BIT Logic (16)



Magnetron (5)



Charge & Regulator (4)



Reference Signal
Generator (7)



Antenna / Receiver



Azimuth Range Indicator (3)



Video Amp (9)



Sweep Demodulator (5)



Timing Logic (8)



Video Switch (5)



Servo Bearing (4)



Radar Receiver (16)



+/-75v Power Supply (16)

Deliveries Completed/On-Going

Reverse Engineering/Fabrication/Test In-Process

Providing Quote to NAVICP



APS-130

Spares Production Team



Customer: NAVICP

- **Randy Webb – Item Manager**

NAVSEA Crane Team

- **Rob Jones - Project Leader, Parts Obsolescence**
- **Mike Robison – PCB Design/Layout**
- **Ryan Shettlesworth – PCB Layout/Parts Ordering**
- **Brian Heeter - Modification Projects/PCB Layout**
- **Ed Rensi – Mechanical Engineering**
- **Kirk Talbott/Jerry Dean – Drafting**
- **Bob Ernst/Eddie Green – Fabrication & Assembly**
- **Darren Julian – Production/Acceptance Test**
- **Aaron Brain – Mechanical Parts Fabrication**
- **Denean Gillenwater – NAVICP Liaison**

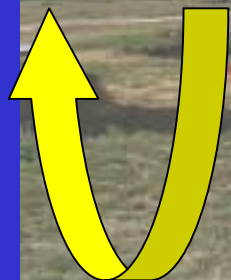
**A Good
Team:
The Key
Ingredient!**

Our Parts Locker....

A-6 AN/APQ-148



The “Bone Yard”
Aerospace Maintenance & Recovery Center
Davis Monthan AFB, Tuscon, AZ



**Recover APQ-148 WRAs Containing SRAs & Components that are Common
with APS-130 or Can Be Modified to APS-130 Configuration**



Quote Generation Process



1. New Build

**Assemble Drawing Package
Establish Bill of Materials
Perform Obsolescence Study
Identify Minimum Buys**

2. Modification

**Publications Impact Study
Engineering Change Proposal
ISO9000 Procedure Development**

3. Reuse

**Turnover to 8023
Obtain Item from Storage
Perform Repair/Overhaul**



New Build Projects



- 1. Order Parts**
- 2. Reverse Engineer Printed Circuit Board (PCB)**
- 3. Test Engineering Design Model (EDM)**
- 4. Procure Production PCB**
- 5. Assemble WRA and/or SRAs**
- 6. Test & Final Inspection**
- 7. Deliver to “A” Condition Stock for Fleet Requisition**



Modification Projects



- 1. Author Intermediate & Operational Publication Changes**
- 2. Author Engineering Change Proposal**
- 3. Author ISO9000 Modification Procedure**
- 4. Pre-Modification Test**
- 5. Modify Unit**
- 6. Test & Final Inspection**
- 7. Deliver to “A” Condition Stock for Fleet Requisition**

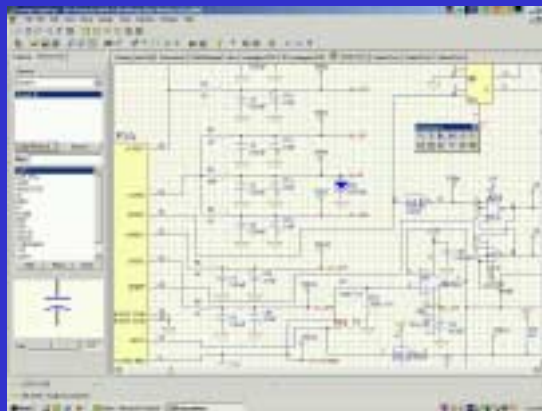
PCB Reverse Engineering Process



Protel DXP PCB Board Design Software



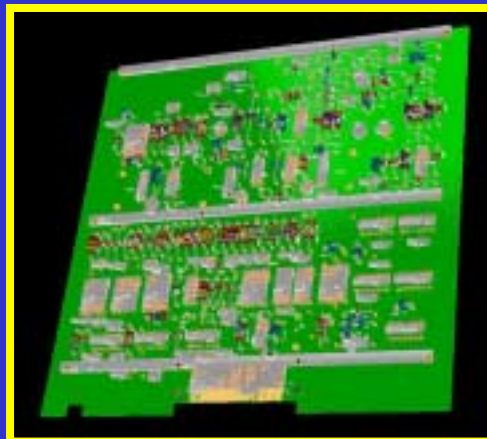
Schematic Generation



Component Placement



- Order/Receive PCB EDM
- Populate/Assemble SRA
- Testing
- Component Placement/
Trace Run Refinement
- Finalize PCB



Finished Product



Layer/Trace Layout

Chassis Reverse Engineering Process



**Azimuth/Range
Indicator Housing**



**CAD Package
Solid Edge**



3-D Model



- **Receive Casting**
- **Final Machine**
- **Corrosion Coating**
- **Final Paint**



Foundry Work

APS-130

Reference Signal Generator



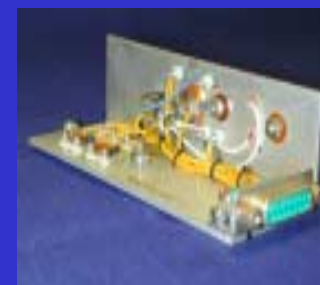
Mother Board & Harness



Complete Reference Signal Generator/Chassis



Servo Bearing



Voltage Regulator



Sweep Generator



Sweep Demodulator



Timing Logic



Video Switch



Sweep Switch



Reference Signal Generator Status



- **FUNDING RECEIVED FOR SEVEN UNITS**
- **COMPONENTS ARE BEING ORDERED/RECEIVED/STOCKED**
- **VIDEO SWITCH/TIME LOGIC/SWEEP DEMOD CIRCUIT CARDS ARE IN PRODUCTION**
- **METAL WORK IS IN PRODUCTION**
- **SWEEP GENERATOR EDM PCB HAS BEEN ORDERED**
- **SWEEP SWITCH AND MOTHERBOARD ARE BEING REVERSE ENGINEERED**

Spin-Off Business

EA-6B

- EA-6B High Speed Anti-Radiation Missile (HARM) Control Panel



HC-130/S-3/P-3

- APS-137 Power Supply Set



Reverse Engineering/Limited Manufacturing Capability Applies to Broad Spectrum of Legacy Electronics, Electro-Mechanical & Mechanical Items



Summary



- **Pace of Technology Advances Far Exceed Pace of DoD System Upgrades**
 - Budget & Acquisition Cycle
 - We're Too Broke Today to Invest Now & Save Money Tomorrow
- **Legacy Systems are the Norm, Not the Exception, & They're Increasing in Numbers**
 - Time Between Initial Fielding & "Legacy Status" is Shrinking
- **"Obsolete" is an Abused Term**
 - Just Because It's 30 Years Old Doesn't Mean It Can't Be Cost Effectively Repaired & Maintained
- **Keeping Systems Viable is a Valuable Capability**
 - A Good Fit With Depot Repair/Overhaul & In-Service Engineering & Logistics
 - Supports the Fleet
 - Maintains Readiness & Gives the War Fighter Capability to Do the Mission



Questions?